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ABSTRACT

Despite a voluminous literature on the determinants of adolescent parenthood, little research exists on school-level influences on nonmarital, school-age motherhood. To address this gap, analyses of data from the National Education Longitudinal Study (NELS) were conducted to determine individual, family, and school-level predictors of nonmarital motherhood of girls between eighth and twelfth grade for a nationally representative sample. All independent variables were measured in eighth grade, and the analyses were repeated separately for black adolescents and white adolescents. The analyses indicated that school safety was an important predictor of nonmarital motherhood. However, school context did not override the effects of family- and individual-level influences. Low individual educational performance measures, such as low test scores and grades, predicted a higher risk of early motherhood, as did being held back in school and repeatedly changing schools. A substantial level of involvement in school clubs and religious organizations was associated with a lower risk of school-age motherhood. Among blacks, attending sexuality education at least once a week was associated with a greater risk of having a nonmarital birth. In general, adolescents least prepared for motherhood and least prepared to be self-sufficient were at the greatest risk of a nonmarital birth during the high school years. (Contains 61 references.) (Author)

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NONMARITAL SCHOOL-AGE MOTHERHOOD: FAMILY, INDIVIDUAL, AND SCHOOL INFLUENCES[1]

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NONMARITAL SCHOOL-AGE MOTHERHOOD: FAMILY, PEER, AND SCHOOL INFLUENCES

Abstract

Despite a voluminous literature on the determinants of adolescent parenthood, little research exists on school-level influences on nonmarital, school-age motherhood. To address this gap, analyses of data from the National Education Longitudinal Study were conducted to examine individual, family and school-level predictors of nonmarital motherhood between eighth grade and twelfth grade, for a nationally representative sample. All independent variables were measured in eighth grade, and the analyses were repeated separately for Black adolescents and White adolescents. The analyses indicate that school safety was an important predictor of nonmarital motherhood. However, school context did not override the effects of family and individual-level influences. Low individual educational performance measures, such as lower test scores and grades, predicted a higher risk of early motherhood, as did being held back in school and repeatedly changing schools. A substantial level of involvement in school clubs and religious organizations was associated with a lower risk of school-age motherhood. Among Blacks, attending sexuality education at least once a week was associated with a greater risk of having a nonmarital birth. In general, adolescents least prepared for motherhood and least prepared to be self-sufficient were at the greatest risk of a nonmarital birth during the high school years.

Birth rates among adolescents in the United States are substantially higher than in other Western industrialized countries and were higher in the early 1990s than they were in the mid-1980s. Moreover, among adolescents, the proportion of births occurring outside of marriage have risen steadily and reached 76 percent in 1994 (Moore, Romano, & Oakes, 1996; United Nations, 1994). Initiatives to reduce those very high rates require a clear understanding of the factors that contribute to nonmarital parenthood during adolescence.

Children increasingly become influenced by persons and institutions outside the family as they move into adolescence (Bronfenbrenner, 1979). Thus, while adolescents continue to be affected by their own individual characteristics and family backgrounds, other influences take on more prominence, including peer influences and the environment of the adolescent's school. However, relatively little research attention has focussed on school context. Numerous studies have examined the effects of family factors on adolescent sexual and fertility behavior, and recently several researchers have examined community-level influences; however only a handful of studies has focussed on school-level influences (see review by Moore, Miller, Glei & Morrison, 1995). To address that gap in the current literature, individual, family, and school-level variables are examined as predictors of nonmarital motherhood between eighth grade and twelfth grade. In the current study, a sample of more than 8,000 girls who were in eighth grade in 1988 are followed across a four-year time period to the age when high school graduation would be anticipated, in order to assess factors associated with the risk of a high school age birth.

Review of the Literature

The ecological model developed by Bronfenbrenner (1979, 1982) recognizes that individual

behavior is influenced by multiple factors from varied domains of life. In keeping with the predictions of such a model, a review of the literature provides evidence that adolescent parenthood is affected by variables from multiple domains.

Individual Characteristics

Individual-level characteristics consistently have been found to predict the risk of early parenthood. For example, studies of the timing of first sexual intercourse have documented strong effects of age, hormone levels, and maturation, particularly among adolescent males (Udry, Talbert, & Morris, 1986; Udry, Billy, & Morris, 1985; Halpern, Udry, Campbell, & Suchindran, 1993), but also among females (Miller, Norton, Curtis, Hill, Schvaneveldt, & Young, 1994). Age is also positively related to the use of contraception at first and most recent intercourse (Pleck, Sonenstein, & Swain, 1988; Moore, Morrison, & Glei, 1995). In addition, individual characteristics have predicted sexual and fertility transitions. Particularly among Whites, adolescents involved in varied non-sexual problem behaviors, ranging from school behavior problems to early substance use, delinquency, and violence, have been found repeatedly more likely to have sexual intercourse, (Ketterlinus, Lamb, Nitz, & Elster, 1992; Ku, Sonenstein, & Pleck, 1992; Rosenbaum & Kandel, 1990). The converse also has been found consistently; that is, adolescents engaged in conventional pursuits (e.g., who were on grade level and received good grades) have been less likely to have sex and more likely to use birth control if they have ever had sexual intercourse (Brewster, Billy, & Grady, 1993; Marsiglio, 1993).

Individual attitudes and aspirations have been associated with sexual activity and teen fertility. For instance, adolescents with higher educational expectations have been more likely to

delay sexual intercourse and avoid parenthood (Sugland, 1992; Plotnick, 1992; Resnick, 1992). Also, more highly religious adolescents have been found to delay sexual initiation (Thornton & Camburn, 1989). Adolescents willing to consider having a nonmarital birth have been significantly more likely to have a birth during their school years (Abrahamse, Morrison, & Waite, 1988; Hanson, Morrison, & Ginsberg, 1989), and adolescents holding higher educational aspirations and more favorable attitudes about abortion have been generally found more likely to obtain an abortion, if pregnancy has occurred (Blum & Resnick, 1982; Brazzell & Acock, 1988). Traditional gender role attitudes have also been found to predict an earlier sexual debut (Moore, Miller, et al., 1995) and less effective contraceptive use (Pleck, Sonenstein, & Ku, 1993).

Peers, Partners, and Siblings

The influence of peers, partners, and siblings has likewise received considerable research attention. Recent studies have indicated that younger siblings have an earlier average age of sexual intercourse than older siblings (Rodgers & Rowe, 1993; Haurin & Mott, 1990). Adolescents who perceived their friends to be sexually active were themselves more likely to have sexual intercourse (Whitbeck et al., 1994). Sonenstein, Pleck, & Ku (1994) report that teen males who anticipated negative reactions to pregnancy from parents or peers were more likely to use contraception.

Family Background and Family Processes

Numerous measures of family socioeconomic status have been correlated with the risk of adolescent childbearing. For example, among adolescents, higher maternal education has been

related to later sexual initiation (Hayward, Grady, & Billy, 1992), a greater likelihood of contraceptive use at first intercourse (Kahn, Rindfuss, & Guilkey, 1990), and a higher probability of abortion, if pregnancy has occurred (Plotnick, 1992). Higher income females who became pregnant were more likely to obtain an abortion (Donovan, 1995). Moore, Morrison, & Glei (1995) also found that girls whose mothers had received welfare were less likely to use contraception at first sexual intercourse. In addition, adolescents in single parent families consistently have been found to be younger when they first have sex, less likely to use contraception, and more likely to become adolescent parents (Wu & Martinson, 1993; Moore, Morrison, & Glei, 1995; McLanahan & Sandefur, 1994).

Underlying family processes have also received research attention. For example, Whitbeck, Conger, & Kao (1993) found lower parental warmth and supportiveness related to daughters' depressive symptoms, which predicted sexual behavior the subsequent year. Among sons, parental warmth and supportiveness was related to less alcohol use, which predicted sexual behavior for the sons more than for the daughters. High parental educational aspirations and involvement in their child's education, even at an early age, have been found to strongly reduce a female adolescent's likelihood of having a birth (Manlove, 1996, 1997). Parental monitoring has also been found to be associated with a reduced risk of teenage motherhood (Hogan & Kitagawa, 1985).

Neighborhood and Community-Level Characteristics

Several recent studies have explored the effects of neighborhood and community level variables on teenage fertility. In one study of race differences in adolescent fertility, controlling

for community level variables was found to substantially reduce the magnitude of race differences in teen sex and parenthood (Brewster, 1994). Brewster et al. (1993) found several indicators of social disorganization particularly important, specifically the rate of divorce and separation among females living in the census tract and the rate of residential turnover. In a study of adolescent males, Ku, Sonenstein, & Pleck (1993) also found evidence of social disorganization effects; young males living in areas of high unemployment had more sexual partners and were more likely to have fathered a child or made someone pregnant than other young males. Additional studies have found that abortion availability was associated with a greater propensity among pregnant adolescent females to resolve pregnancy in an abortion (Lundberg & Plotnick, 1990; Serrato, 1990; Moore, Blumenthal, Sugland, Hyatt, Snyder, & Morrison, 1994).

Policy - Oriented Characteristics

Several studies have examined the effects of public policies, certainly the most distal of the influences considered, with widely varying results. For example, studies that have examined the influence of state-level welfare benefits on early sexual activity and on teenage and nonmarital fertility have exhibited conflicting results. Clarke & Strauss found a positive association between welfare benefits and teen fertility; however, neither Haveman, Wolfe, & Peterson (1995) nor South & Lloyd (1992) found higher welfare benefits related to higher adolescent fertility. Lundberg & Plotnick (1995) reported that welfare benefit levels had trivial effects on pregnancy and pregnancy resolution and larger effects on the probability of marriage given a premarital pregnancy. Additional studies found that White but not Black females in states with higher

welfare benefits were more likely to have a nonmarital birth (Lundberg & Plotnick, 1990; Hill & O'Neill, 1993); while adolescents living in states with higher welfare benefits were not found to initiate sexual intercourse at an earlier age (Moore, Morrison, & Glei, 1995).

Sexuality education and the media represent two other policy-relevant influences on nonmarital fertility. Recent studies, using both survey data and program data, have concluded that sexuality education increases knowledge but has no, or only minimal effects, on behavior; thus, sexuality education has neither hastened early sexual activity as some feared, nor has it had much effect in reducing sex or increasing contraceptive use (Kirby, Short, Collins, Rugg, Kolbe, Howard, Miller, Sonenstein, & Zabin, 1994). Very little empirical work has examined the effects of media influences on adolescent sexual behavior, despite the high sexual content of media and the high levels of media consumption among adolescents.

School - Level Characteristics

Another source of policy-relevant information which has received relatively little research attention is the influence of school-level factors on teenage fertility. Despite what has accumulated as a voluminous literature on the determinants of adolescent parenthood, little research exists on the influence of school factors, specifically. Over the past decade, only a handful of studies has been conducted -- using data collected by the Department of Education -- on the effects of school factors other than sexuality education on adolescent pregnancy and parenthood. Those studies have indicated that school-level characteristics, as well as individual academic performance, aspirations, and measures of school engagement such as dropout status, may affect individual fertility behavior. Hanson, Morrison, and Ginsburg (1989) examined the

factors predicting teenage fatherhood among a national sample of males who were sophomores in 1980. Over and above family background and individual-level factors, males with school discipline problems and a willingness to consider having a child out of wedlock were found to have an elevated probability of teenage fatherhood. However, no other academic or school context variables, including grades, math and reading scores, attendance at a private school, nor enrollment in sexuality education were related to early fatherhood. Mayer (1991), using data from the 1980 High School and Beyond survey, found that girls attending schools with a large proportion of high socioeconomic status students were less likely to have a birth by twelfth grade. The effect of school-wide SES was stronger for girls who were themselves from families of lower socioeconomic status.

Abrahamse, Morrison, and Waite (1988) studied data from adolescent females in the High School and Beyond sample, a nationally representative sample of high school sophomores who were followed through the time of high school graduation. Sophomores willing to consider parenthood outside of marriage were found more likely to become high school age mothers, but the researchers did not report on the effects of school level variables. Manlove (1996) followed females in the National Education Longitudinal Study of 1988 from eighth grade through the expected year of high school graduation to explore the effects of dropping out of school in predicting a high school age pregnancy that ended in a live birth. That study found that dropping out of high school increased the risk of having a subsequent school-age pregnancy that ended in a birth for Whites and Hispanics, but not for Blacks. Over and above the effect of dropping out, several measures of academic achievement and aspirations were also found to be associated with the risk of pregnancy and motherhood for Whites, Blacks and Hispanics. Several variables

predicted the risk of pregnancy only for Black females; specifically, Black students attending private or Catholic schools were less likely to become pregnant, while those rated as having low ability by teachers and those enrolled in sexuality education once a week or more in eighth grade were more likely to have a pregnancy during their high school years. Among White females, pregnancy was less likely if the adolescent attended a high SES school or a virtually all-White school. Also, among all racial/ethnic groups, those adolescent females whose parents were more involved in school or who had higher educational aspirations for their daughters, tended to have a lower risk of pregnancy and motherhood.

School safety has been cited as another important component of school climate which may influence individual behaviors. For example, one of the educational goals promoted by the National Education Goals Report under GOALS 2000 is that, "by the year 2000 every school in the United States will be free of drugs, violence, and the unauthorized presence of firearms and alcohol and will offer a disciplined environment conducive to learning" (1994, p. 11). However, research on the effects of safety and the school environment on adolescent outcomes is lacking.

Since the school, like the neighborhood, is a place where teens spend a large portion of their time, this study examines whether school quality and environment may influence the risk of a nonmarital birth among high school age students. We examine a large, nationally representative data base that includes rich school-level information to further explore the independent effects of school factors on nonmarital teen fertility.

Methods

Data

The data used in this study come from the National Education Longitudinal Study of 1988 (NELS:88) sponsored by the National Center for Education Statistics. NELS:88 was designed to assess trends in secondary school education, specifically the transition into and progress through high school, and the transition into post-secondary school and the world of work. Data were collected by the National Opinion Research Center (NORC). The survey used a two-stage stratified, clustered sample design in which the first stage involved the selection of schools and the second stage involved the selection of about 24 students per school.

We examine data from three waves of surveys: the base year in 1988, the first follow-up in 1990, and the second follow-up in 1992. In the base year, students were eighth graders and by the 1992 follow-up they were in 12th grade or had dropped out. Dropouts were followed in both the first and second follow-up surveys and are included in our analyses.[1]

In 1988, 24,599 students from 1,057 public, private, and church-affiliated schools from all 50 states and the District of Columbia completed questionnaires, most of which were administered in the school and returned by mail to NORC. Questionnaires were also completed in 1988 by the parent most knowledgeable about the child, by the senior school administrator, and by teachers from two randomly selected subject areas for each student. The base year student population excluded students with severe mental disabilities, students whose command of the English language was insufficient to understand survey materials, and students with physical or emotional problems that would limit their participation.

In the first follow-up (1990), all students were surveyed in schools containing at least ten eligible students and a subsample of students were surveyed in schools with less than ten eligible students. Both the first and second follow-ups included student, dropout, school, and teacher surveys, and in 1992 the parent was again surveyed. A total of 16,489 of the students from the base year sample completed all three surveys. This represents a 95 percent completion rate among those students and dropouts who were eligible in all three waves.

Sample

The current sample included 8,349 females who completed all three waves of surveys. Analyses were based on a sample of 7,930 females, 471 of whom had a nonmarital birth and 7,459 of whom had no birth by 1992. The remaining 419 cases were excluded from the analyses because they were either pregnant (n=174), had a marital birth (n=49), had a birth of unknown marital status (n=132) or were missing data on birth status (n=64) in 1992.[2] Those girls who reported they had not yet had a birth but were pregnant at the time of the 1992 interview were excluded for several reasons, specifically because 1) it could not be assumed that the pregnancy would end in birth, 2) the mother's marital status at birth was not reported, and 3) it was quite possible that the birth might occur after high school graduation. While the year after high school is quite young to become a parent, this analysis focussed on births to teens who were still in high school.

Measures

Dependent Variable

The study examined nonmarital births during the high school years. The dependent measure was created as a dichotomous variable measured at the time of the 1992 survey when the young women were in the equivalent of twelfth grade (note that both students and dropouts were included in the study).

Demographic Variables

It is important to account for racial/ethnic differences in the incidence of nonmarital adolescent childbearing, and thus we developed measures for Black, Asian, Hispanic, and Native American heritage. To control for family structure, we created two dichotomous variables representing the family with whom the female was living in eighth grade. One variable, based on a parent report, indicated residence with two married biological parents, and the second variable indicated residence with a single biological parent in eighth grade.[3] The reference category for both variables was all other living arrangements. Family socioeconomic status was assessed with measures of educational attainment of the parent and family income (in thousands of dollars) when the student was in eighth grade. An interval level measure of family income was created by recoding a categorical variable to the midpoint of each category. The parent respondent's education was used as an ordinal variable which ranges from 1 through 6, in which

the lowest category includes parents who did not finish high school and the highest category is Ph.D., M.D. or other.

Independent Variables

Independent variables were taken from four sources (student, parent, teacher, and school questionnaires). Although all of the hypothesized factors found to predict adolescent childbearing were not included in these data, the models did control for crucial predictors from each major domain of influence. Since the primary focus of this study was on school variables, the main purpose of including measures of family and peer influences was to control for other factors before adding school-level measures. For this reason, a broad set of constructs was assessed, ranging from parental monitoring of the adolescent and parent-child communication to peer perceptions of the adolescent's popularity. The data used to form scales were generally taken from one or two questions, as few long scales were included in NELS. Where available, psychometric information has been provided. All independent variables were measured in 1988 when the girls were in eighth grade in order to have prospective measures of characteristics associated with subsequent fertility.

Family and Peer Variables. Several measures of family influence and involvement were included in the models. To measure parental monitoring of the adolescent's involvement with her peers, the parent's report of knowing the names of their child's friends and the parents of their child's friends was used. Two dichotomous variables were created; the first was coded 1 if the parent did not know any names of their child's friends, and the second was coded 1 if the parent knew the names of all of the parents of their child's friends. The reference group is the large

middle group, in which the parents knew at least some friends and perhaps some friend's parents. Thus, the extremes of high monitoring and low monitoring were compared with typical levels of monitoring.

Low parent-child communication was based on two student-report questions. It was coded 1 if the student reported that since the beginning of the school year she had not had a discussion with her parent(s) about selecting courses or programs at school nor had she discussed school activities or events of particular interest to her; otherwise it was coded zero. A measure of the lack of parental involvement in school, based on a student report, indicates that since the beginning of the school year neither parent had attended a school meeting nor a school event such as a play, concert, gym exhibit, sports competition, honor ceremony or science fair in which the student participated. A measure of high parental educational expectations for the adolescent was measured by a dichotomous variable coded 1 if the parent expected the child to graduate from college.

Peer perceptions of the student's academic ability and popularity were reported by the girl. The student was asked a series of questions about how "other students in your classes see you." One of the items in this series asked whether: "other students see you as a good student." A dichotomous variable was coded 1 if the student said "not at all." In another item youth were asked whether, "other students in class see you as popular." Two dichotomous variables indicated if the adolescent responded "very" or "not at all" popular, where the reference group was those students who reported somewhat popular.

Involvement in extracurricular activities was measured by two dichotomous variables. The first indicated if the girl was an officer of a club or organization.[4] The second variable measured

involvement in a religious organization at school. Two dichotomous measures of child behavior problems obtained from a parent report were included in the model. The first indicated whether the parent had been contacted by the school since the beginning of the school year about their child's problem behavior. A second measure was coded 1 if the parent reported that the child was ever considered to have a behavior problem at school.

Academic performance and mobility. One of the strengths of the NELS data is the availability of multiple sources of information on students' academic progress, including teacher reports and test scores. Measures of the student's own, and her teacher's, subjective evaluations of her academic success were included. Students were asked how far in school they thought they would get, and this information was used to create three variables for (a) expects high school graduation or less, (b) expects college graduation, and (c) expects graduate school education. Another dichotomous variable was created from the teachers' reports that the student consistently performed below their ability level. If both of the teachers who were surveyed when the student was in the eighth grade reported that to be true, the variable was coded 1; otherwise, it was coded zero.

Several measures of academic success came from student, parent, and teacher reports. Academic performance was created from the student's report of grades across four subject areas. It was coded on a four-point scale where 4.0 = mostly A's and 1.0 = mostly D's. Academic capability was accounted for with a standardized test composite score on reading and math, on which the scale ranges from 25.40 through 70.98.[5] In addition, the parent's report regarding how often the school contacted them about their daughter's academic performance since the beginning of the eighth grade was included as a measure of academic difficulties. If this occurred at least

once, a dichotomous variable was coded 1. For those few cases where parent data were not available, the student's report was used. Another variable measured if the student was behind the grade level that they should have attained in 1988. If the youth was 15 years of age or older in eighth grade, this variable was coded 1[6]. A final dummy variable indicated students who had changed schools four or more times since first grade (excluding changes due to promotions, [e.g., into high school]).

School Characteristics. Because varied measures of the school environment were available, it was possible to examine the incremental effect of school factors over and above other predictors. Several measures of the school context were included. The family structure of students at the school was measured by a variable that was coded 1 if 50 percent or more of the eighth graders lived in single parent families. As a proxy for school economic composition, a variable was coded 1 if more than 50 percent of students received free lunch. A dichotomous variable measuring the racial composition of the school was coded 1 if more than 40 percent of the students in the school were Black.[7] Also, a dichotomous variable was coded 1 for students who attended sexuality education classes at least once a week during eighth grade.

An index of school safety and crime was created from student reports about the degree to which the following were felt to be a problem in their schools: physical conflict among students, robbery or theft, vandalism of school property, student use of alcohol, student use of illegal drugs, student possession of weapons, physical abuse of teachers, and verbal abuse of teachers. The response categories were "not at all," "minor," "moderate" and "serious." The scale ranges from 0 through 24, with an alpha of 0.91, and a high score indicated more serious problems. Similar questions were asked of the youth's teachers. Preliminary analyses were run to test

whether different levels of teacher reports of safety differentially influenced the likelihood of a nonmarital birth. Only those schools rated by teachers as very safe were distinct. Therefore, a dichotomous variable was created to denote schools which teachers scored as the top 20 percent in terms of safety.

Analysis

Analyses were performed on weighted data using logistic regression to predict the occurrence of a nonmarital school-age birth. Because the NELS:88 sample design involved stratification by school and disproportionate sampling of certain strata, there is a sampling design effect. That is, by drawing multiple students from selected schools, these students were more similar to each other than they would be had they been drawn from a simple random sample of the same size. This causes the standard errors to be deflated, resulting in higher significance levels than really should be the case. In order to account for these design effects, a procedure which estimates models with accurate standard errors -- SUDAAN -- was used.

In general, levels of missing data were low (1-2 percent for students, 5 percent for teachers, and 6 through 9 percent for parents). To avoid losing cases with missing data, the mean was coded for interval level variables or values were coded to the modal category for dichotomous independent variables and controls. Final analyses were repeated including flags for missing data. We found that those who had missing data on control variables or on parent report items were more likely to have had a nonmarital birth. However, the substantive results remained unchanged with the addition of flags for missing data.

Independent variables were entered into the models in steps. Reflecting our ecological perspective, the more proximate influences were entered first, with more distal factors entered last. Thus, family and peer variables were entered after the control variables. Next, academic performance and mobility variables were entered. A final model included school characteristics.

Results

All Race/ethnicity Groups

Table 1 presents weighted results for all race/ethnicity groups combined. Note (from the appendix) that 8.4 percent of the total sample had a nonmarital, high school-age birth.

(Table 1 about here)

The initial model presents odds ratios, controlling for a limited set of background variables. Results for this model confirmed findings from previous studies. For example, Black adolescents were more than three times as likely to have a school-age nonmarital birth as White teens, while Hispanic adolescents were nearly twice as likely as White adolescents to have a birth. In addition, family structure effects were substantial. Compared with a reference category of girls living in any other family type, eighth grade girls living with both biological parents were only a third as likely to have a birth. Girls living with a single biological parent were not significantly different from girls in the reference category. Family income was negatively associated with the likelihood of a birth. That is, each increase of $1,000 in family income resulted in a corresponding 1 percent decrease in the probability of a nonmarital birth. None of those findings was surprising; however, the resilience of several of the relations is noteworthy. Specifically, even after numerous variables from the family and school domains are added in

Models 2 through 4, Hispanic girls remained 1.7 times more likely and Black girls were 2.7 times more likely to have a nonmarital birth by the end of their high school years than were White girls. Moreover, girls living with both biological parents in eighth grade remained only half as likely to have had a birth four years later.

In Model 2, we added a series of variables that assessed parent, peer, and individual behaviors. Interestingly, neither parental monitoring, communication, nor involvement was significantly related to whether the daughter became a school-age mother; however, those daughters whose parents expected them to complete college were only 41 percent as likely to have had a baby during their high school years as girls whose parents had lower expectations. None of the peer variables were significant; however, girls who were an officer in a school club or organization, and girls who were involved in a religious organization that met in the school were significantly less likely to have a birth by the time of twelfth grade.[8] Belonging to a club or attending church, but not being involved in a religious organization in school, was not associated with having a child during the high school years.[9] Also, when parent and peer behavior variables were added in Model 2, family income became non-significant, suggesting that the influence of family income was transmitted through the involvement and expectations of parents, along with adolescents' participation in clubs and organizations.

In Model 3, measures of the girls' school performance, educational expectations, and school mobility were added to the equation. Once the girls' own educational expectations, school performance, and school mobility were added in Model 3, the effect of parental educational expectations became non-significant. But, the girls' own expectations were significant; specifically, girls who planned to complete college and even more so those who planned to

attend graduate school were substantially less likely to bear a child during their high school years. Similarly, girls with higher grades and better scores on standardized achievement tests were less likely to have a nonmarital birth. Girls who were already behind grade (age 15 or older) when they were attending grade eight were twice as likely to have a high school age birth. The fact that these girls were older when they were in eighth grade may be a risk because they were behind in school and/or because older teens are more physically mature. In addition, girls who changed schools four or more times between first and eighth grade were twice as likely to have a nonmarital birth during their high school years as girls who changed schools less frequently.

Variables assessing the school context, added in Model 4, were not related to the probability of a high school age nonmarital birth, after controlling for the other background characteristics and individual level variables in the model. Interestingly, with individual academic and school context measures in the model, girls who felt their peers saw them as unpopular were significantly less likely to have a high school age birth.

Results for White and Black Girls

Table 2 repeated the analyses shown in Table 1, Model 4, for two subgroups with sufficient cases to support separate analyses. Note (from the appendix) that 5.2 percent of White teens and 22.2 percent of Black teens experienced a nonmarital school-age birth. The most noteworthy result is the similarity of the results for the Black and White subgroups. In each case, girls living with both biological parents in eighth grade were substantially less likely to have a school-age nonmarital birth than girls in a reference group consisting of girls living in any family type other

than with both biological parents or a single parent. In addition, girls with high educational expectations were substantially less likely to have a birth before the time of high school graduation. Note that expecting to attend graduate school was associated with a substantially lower probability of a nonmarital birth during the high school years for White teens, whereas expecting to graduate from college was significant for Black teens. Also, among both groups, girls with better grades were less likely to have a baby, while school-age motherhood was considerably more likely for girls who frequently changed schools before eighth grade and who were already age 15 when they were enrolled in eighth grade. Moreover, a number of variables were not significant for either racial group, including the measures of parental communication and monitoring.

(Table 2 about here)

More school context variables were significant when models were run separately by race. Among the contextual variables, safety and crime influenced the risk of a nonmarital birth, for both Blacks and Whites. A student assessment that school crime was high was significantly associated with a greater risk of a nonmarital birth for Whites, and a teacher assessment of a safe school environment was significantly associated with a reduced risk of a birth for Black adolescents. Both of the models, however, demonstrated that students who attended schools with a safer environment were less likely to have a nonmarital birth.[10]

Several differences are also apparent in these models. White girls who felt that they were seen by their eighth grade peers as not being a good student were less likely to have a birth, after controlling for other measures of achievement, while Black girls who were seen as not at all popular were also less likely to have a birth. The effect of being active in a school-based

religious organization was found only for Whites, while the effect of being an officer in a school club or organization was significant only for Black adolescents. For Blacks, higher standardized test scores were associated with a reduced likelihood of having a nonmarital birth. The effect of being enrolled in a sexuality education class once a week or more in eighth grade was associated with a much higher risk (three times the risk) of adolescent motherhood for Blacks only. Although we had anticipated weekly sexuality education in eighth grade to be more common in disadvantaged communities, we found instead that black girls were more likely to attend sexuality education classes if they were from intact families and if they attended Catholic schools or schools with a high proportion of minority students. Not knowing the content of the sexuality education received, it is not clear why sexuality education posed a risk factor for Black girls.[11]

Discussion and Conclusions

Perhaps the most striking finding is that none of the measures of the school context examined here were significant in analyses of the entire sample. However, when Black and White girls were studied in separate analyses, one construct emerged as important. Specifically, the measures of school safety and crime appeared to matter for both groups. However, the teacher report of safety was significant for Blacks, while the student report of crime was significant for Whites. Students who attended schools that were perceived to have especially low crime levels--either by their teachers or themselves -- were less likely to have a nonmarital teenage birth, even after controlling for family background, individual performance, and school socioeconomic status (as measured by the proportions of students receiving school lunch). Though both teacher ratings of school safety and student ratings of school crime were correlated with measures of

socioeconomic status such as the proportion of students receiving free lunch, the two scales were only modestly correlated (.15) and seem to tap different aspects of "safety."[12] We suspect that student as compared to teacher reports were measuring somewhat different elements of a larger construct of school/community characteristics, including order, respect for property, personal safety, a positive learning environment, discipline and respect for adults. Black girls whose teachers rated the school in the top quintile of safety did appear to be at a lower risk of motherhood, after controlling for individual, family, and peer variables. Thus, only the safest environments produced a significant effect. No similar effect of teachers' perceptions of school safety was found for White girls. Yet, White girls whom themselves rated their school as less safe and more crime-ridden in eighth grade had a higher likelihood of school-age motherhood, and each additional increment to crime served as a risk factor. The relative importance of teacher versus student ratings is puzzling; nevertheless, the overall nature of the association was quite comparable: less crime and disorganization in the schools predicted a lower incidence of school-age nonmarital motherhood.

More surprising is the fact that these measures of school safety and crime were the only school context variables among the available measures to be associated with the risk of a school-age nonmarital birth. These composite variables may, in fact, serve as a proxy for an even larger construct, the overall disadvantaged or advantaged character of the local community. One consistent conclusion of contextual influences is that smaller geographic units closer to the adolescent are better predictors than more distal geographic units (Brewster, et al., 1993). Thus, census tract data have been found to be better predictors than county-level data. Such a conclusion leads to the expectation that school-level variables, being smaller and more proximal

to the adolescent, should be better predictors than either county or zip code variables. However, school context does not appear to override or supersede the effects of family and individual-level influences. Indeed, studies that make the comparison generally have found that individual and family-level predictors were stronger predictors of adolescent behavior than community-level variables (Ku, et al., 1993; Duncan, 1995). One of the ways families have influence on their children, of course, is in the selection of neighborhoods and schools for their children. Such a selection process suggests that, at least for some families, neighborhood context reflects family characteristics.

Although school context variables generally were not strong predictors of high school age motherhood, at least with the variables measured within the current study, numerous other education-related variables did represent critical factors. For example, individual academic performance measures such as lower test scores and grades both predicted a higher risk of early motherhood, as did being retained in grade and repeatedly changing schools. A question for policy makers is whether altering school policies to minimize school changes and grade retention would reduce the risk of adolescent motherhood. Recognizing the importance of family factors, it may nevertheless be the case that programs designed to help students with academic and behavior problems in elementary school might reduce the risks adolescents face in junior and senior high school.

Since sexuality education classes are designed in part to lower the risk of adolescent pregnancy, the positive association between sex education and early motherhood is troubling. We found that this association was concentrated among Blacks. Attending sexuality education classes once a week or more in eighth grade is rather unusual; whether this variable reflects

school, family, curriculum or individual characteristics was not clear. Regardless, this study like many others (Kirby, et al., 1994) finds no evidence that sexuality education as provided in American schools reduces the probability of school-age parenthood. Sexuality education alone is not enough of an intervention to reduce pregnancy.

On the other hand, a substantial level of involvement in school organizations, particularly clubs for Blacks and school religious organizations for Whites, was associated with a lower risk of school-age motherhood, after controlling for other factors.[13] Mere membership in such organizations, however, was not found to bear an association with early childbearing (results not shown). As found in the Teen Outreach program (Allen, Kuperminc, Philliber, and Herre, 1994), establishing a high level of involvement in a school-related organization may be a promising strategy for preventing early childbearing.

It seems surprising that neither parental monitoring nor communication predicted the likelihood of a nonmarital birth. In preliminary analyses, we experimented with a number of coding variations; however our expectation that greater communication would predict negatively to motherhood was never fulfilled. Perhaps the questions on school monitoring and communication available in NELS:88 did not carry over to non-school behaviors. Alternatively, monitoring may be a far more complex construct that reflects elements of the adolescent's need for monitoring and the specific monitoring strategies employed, as well as the intensity of parental monitoring and communication. Similar questions exist for the measure of peer perceptions of popularity. It is not obvious why teens who report themselves as unpopular in eighth grade have a lower probability of nonmarital parenthood during their high school years.

Measures may need to distinguish popularity with males from popularity with females to predict sexual and fertility behavior.

If there is any single theme that crosses the varied analyses presented here, it is that those young women least prepared for motherhood and self-sufficiency are at the greatest risk of a high school age nonmarital birth. School and family strategies to help adolescents become engaged in schoolwork and school activities and to be successful in academic pursuits need to be considered as a promising direction for affecting fertility outcomes.

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Table 1. Likelihood of Non-Marital Birth By Twelfth Grade, Odds Ratios, Weighted

	Model 1	Model 2	Model 3	Model 4
Demographic Characteristics				
Asian (0,1)	0.49	0.52	0.51	0.54
Native American (0,1)	1.61	1.50	1.28	1.06
Hispanic (0,1)	1.95***	1.89***	1.82**	1.73**
Black (0,1)	3.12***	3.09***	3.10***	2.69***
White	--	--	--	--
Two biological parents (0,1)	0.34***	0.35***	0.47***	0.46***
Single biological parent (0,1)	0.73	0.76	0.93	0.90
Else	--	--	--	--
Family income, in 1000s (0-250)	0.99*	0.99	1.00	1.00
Parent's education (1-6)	0.81	0.92	0.94	0.95
Parent, Peer, and Behavior Variables				
Parent doesn't know any friends (0,1)	--	1.49	1.27	1.25
Parent knows parents of all friends (0,1)	--	0.84	0.83	0.82
Parent knows some friends/maybe parents	--	--	--	--
Low parent-child communication (0,1)	--	1.12	1.01	1.04
Parent not attended school mtg/event (0,1)	--	1.18	1.06	1.04
Parent expects child college grad+ (0,1)	--	0.41***	0.77	0.80
Peers see R as not at all good student (0,1)	--	1.08	0.76	0.78
Peers see R as popular (0,1)	--	1.05	1.26	1.23
Peers see R as not at all popular (0,1)	--	0.74	0.70	0.68*
Peers see R as somewhat popular	--	--	--	--
Officer of club/org (0,1)	--	0.57**	0.65*	0.65*
Involved in school religious org. (0,1)	--	0.46***	0.54*	0.55*
Note from school about behavior (0,1)	--	1.50	1.17	1.11
Ever considered a behavior problem (0,1)	--	1.27	1.03	1.02
Academic Performance and Mobility				
Student expects beyond high school	--	--	0.77	0.75
Student expects college grad	--	--	0.59*	0.58**
Student expects grad school	--	--	0.45**	0.43**
Student expects high school or less	--	--	--	--
Performs below ability, teacher (0,1)	--	--	1.25	1.25
Grades (0.5 - 4.0)	--	--	0.62**	0.61**
Standardized test scores (24.5 - 71)	--	--	0.97**	0.97**
Note from school about academics (0,1)	--	--	1.08	1.08
Behind Grade (1=Age 15+ in 8th grade)	--	--	2.09***	2.10***
Changed school 4+ times (0,1)	--	--	2.07**	2.10***

continued

Table 1. Likelihood of Non-Marital Birth By Twelfth Grade, Odds Ratios, Weighted

	Model 1	Model 2	Model 3	Model 4
School Characteristics				
Attended sex educ once/wk (0,1)	--	--	--	1.38
More than 40% Blacks in school (0,1)	--	--	--	1.24
More than 50% Free lunch in school (0,1)	--	--	--	1.16
50%+ 8th graders in single-parent family (0,1)	--	--	--	0.84
School crime, student (0 - 24)	--	--	--	1.01
Top 20% on school safety, teacher (0,1)	--	--	--	0.66
Number of Cases	7930	7930	7930	7930

*** $p \leq 0.001$ ** $p \leq 0.01$ * $p \leq 0.05$

Source: 1988, 1990, and 1992 National Education Longitudinal Study, weighed analyses by Child Trends, Inc.

Note: Italicized items represent contrast categories.

Table 2. Likelihood of Non-Marital Birth By Twelfth Grade, by Race, Odds Ratios, Weighted

	Whites	Blacks
Demographic Characteristics		
Two bio parents (0,1)	0.35***	0.41*
Single bio parent (0,1)	0.61	0.85
Else	--	--
Family income, in 1000s (0-250)	0.99*	1.00
Parent's education (1-6)	0.83	1.02
Parent, Peer, and Behavior Variables		
Parent doesn't know friends (0,1)	1.68	0.76
Parent knows parents of all friends (0,1)	0.66	1.10
Parent knows some friends/maybe parents	--	--
Low parent-child communication (0,1)	0.85	1.12
Parent not attended school mtg/event (0,1)	0.80	1.08
Parent expects child college grad+ (0,1)	1.28	0.57
Peers see R as not at all good student (0,1)	0.46**	1.38
Peers see R as popular (0,1)	1.18	0.84
Peers see R as not at all popular (0,1)	0.95	0.46*
0=Peers see R as somewhat popular	--	--
Officer of club/org (0,1)	0.86	0.47*
Involved in school religious org. (0,1)	0.30***	1.02
Note from school about behavior (0,1)	1.37	0.95
Ever considered a behavior problem (0,1)	1.18	0.65
Academic Performance and Mobility		
Student expects beyond H.S. (0,1)	0.73	0.74
Student expects college grad (0,1)	0.68	0.40*
Student expects grad school (0,1)	0.31**	0.57
Student expects H.S. or less	--	--
Performs below ability, teacher (0,1)	1.30	1.76
Grades (0.5 - 4.0)	0.57**	0.59*
Standardized Test scores (24.5 - 71)	0.98	0.95**
Note from school about academics (0,1)	1.04	1.17
Behind Grade (1=Age 15+ in 8th grade)	1.79**	2.45**
Changed school 4+ times (0,1)	1.95**	3.53***
School Characteristics		
Attended sex educ once/wk (0,1)	1.03	3.00**
More than 40% Blacks in school (0,1)	1.80	0.90
More than 50% Free lunch in school (0,1)	1.23	1.03
50%+ 8th graders in single-parent family (0,1)	0.94	0.74
School crime, student (0 - 24)	1.05**	0.98
Top 20% on school safety, teacher (0,1)	1.06	0.36**
Number of Cases	5613	806

*** $p \leq 0.001$ ** $p \leq 0.01$ * $p \leq 0.05$

Note: Italicized items represent contrast categories.

Source: 1988, 1990, and 1992 National Educational Longitudinal Study, Analyses by Child Trends, Inc., weighted.

ENDNOTES

1. The sample was freshened in 1990 and 1992 by adding students to the sample to ensure representative samples of tenth and twelfth graders; however, these students are not in our study because data for the eighth grade are not available.

2. Basic sociodemographic characteristics of those excluded from analyses because of missing data were compared to those who were included in analyses. These 419 respondents were more likely to be Hispanic, less likely to be Asian, less likely to live with two biological parents in eighth grade and more likely to live with a single parent. On average, they had a lower family incomes and their parent had lower educational attainment.

3. The measure for a single-parent family does not include single parents who are cohabiting with a partner of the opposite sex. For both measures, only girls who lived with the parent all of the time are defined as living with two parents or a single parent.

4. A measure of any club or extracurricular activity involvement was examined but not found to relate to the likelihood of a school-aged nonmarital birth.

5. The standardized test score is an equally weighted average of standardized reading and mathematics tests, which were multiple choice tests administered in the eighth grade. Test scores were re-standardized using the questionnaire weight to have a mean of 50 and a standard deviation of 10.

6. Note that this variable captures whether the student was behind in school and also indicates older students.

7. The measure of racial composition is used to indicate schools which have a large percentage of Black students. Note, from the appendix, that only 3.7 percent of white teens attended schools with more than 40 percent Black students. A cut-off point that was higher would have too few

cases to indicate a school with a large percentage of Black students.

8. It appears that adolescents who attended private, religious schools were much more likely to report involvement in a religious organization at school; however, these students represent only about 4 percent of the sample. Students attending Catholic or other private schools were not more likely than public school students to report involvement in a religious organization.

9. Another set of analyses (not shown here) indicated that church attendance per se was not a significant predicator of nonmarital motherhood.

10. The two school safety measures were tested for collinearity, but the correlation was only .15.

11. The influence of sexuality education on multiple proximal determinants of fertility is not clear. For example, sexuality education that promotes abstinence may be associated with a lower likelihood of resolving a pregnancy with an abortion.

12. When the significant scale was removed from the analysis, the other scale remained non-significant.

13. Part of this effect may be due to the fact that participation in religious organizations at school is higher for girls who attend private religiously oriented schools, where we presume there is relatively strong support for delaying sexual activity.

Appendix. Percent in Category or Mean and Standard Deviation of All Variables, for Total Sample, Whites, and Blacks

Variable Definition	Range	Total % (SD)	Whites Percent/Mean (SD)	Blacks Percent/Mean (SD)
Nonmarital Birth	0,1	8.4% (.28)	5.2% (.22)	22.2% (.42)
Demographic Characteristics				
Asian	0,1	3.5% (.18)	-- --	-- --
Native American	0,1	1.2% (.11)	-- --	-- --
Hispanic	0,1	10.5% (.31)	-- --	-- --
Black	0,1	13.3% (.34)	-- --	-- --
0=White	--	71.5%	--	--
Living with two biological parents, parent report	0,1	66.5% (.47)	70.5% (.46)	40.0% (.49)
Living with a single biological parent, parent report	0,1	16.5% (.37)	13.3% (.34)	34.3% (.48)
0=Else	--	17.0%	16.2%	25.7%
Family income, in $1000s, parent report	0 - 250	39.0 (33.29)	42.9 (34.65)	25.2 (20.76)
Parent's education, categorical, parent report	1 - 6	3.0 (1.21)	3.2 (1.18)	2.7 (1.06)
Parent, Peer, and Behavior Variables				
Parent doesn't know any of youth's friends, parent report	0,1	6.6% (.25)	4.1% (.20)	13.3% (.34)
Parent knows the names of parents of all youth's friends, parent report	0,1	38.3% (.49)	39.7% (.49)	37.1% (.48)
0=Parent knows the names some friends, parent report	--	55.1%	56.2%	49.6%
No parent-child discussion of selection of school courses/programs or school activities, student report	0,1	14.8% (.36)	13.0% (.34)	15.6% (.36)

continued

Appendix: Percent in Category / Mean and Standard Deviation of All Variables, for Total Sample, Whites, and Blacks (continued)

Variable Definition	Range	Total % (SD)	Whites Percent/Mean (SD)	Blacks Percent/Mean (SD)
Parent has not attended a school meeting or event during school year, student report	0,1	18.9% (.39)	15.9% (.37)	25.5% (.44)
Parent expects youth to graduate from college, parent report	0,1	56.8% (.50)	58.8% (.49)	53.1% (.50)
Peers see Youth as "not at all" a good student, student report	0,1	5.6% (.23)	5.9% (.24)	3.8% (.19)
Peers see Youth as popular, student report	0,1	15.1% (.36)	13.7% (.34)	22.1% (.42)
Peers see Youth as "not at all" popular, student report	0,1	17.6% (.38)	16.8% (.37)	15.1% (.36)
0=Peers see Youth as somewhat popular	--	67.3%	69.5%	62.8%
Youth is an officer of a club or organization, student report	0,1	19.2% (.39)	19.8% (.40)	19.6% (.40)
Youth is has participated in a school religious organization during the current school year, student report	0,1	15.6% (.36)	17.5% (.38)	9.9% (.30)
Parent received a note from school about youth's behavior since beginning of school year, parent report	0,1	24.9% (.43)	22.1% (.42)	38.4% (.49)
Youth was ever considered a behavior problem in school, parent report	0,1	5.3% (.22)	3.9% (.19)	10.6% (.31)
Academic Performance and Mobility				
Student expects to continue school beyond H.S. graduation, student report	0,1	21.7% (.41)	19.7% (.40)	25.7% (.44)
Student expects to graduate from college, student report	0,1	43.9% (.50)	47.1% (.50)	36.0% (.48)

continued

Appendix: Percent in Category / Mean and Standard Deviation of All Variables, for Total Sample, Whites, and Blacks (continued)

Variable Definition	Range	Total % (SD)	Whites Percent/Mean (SD)	Blacks Percent/Mean (SD)
Student expects to attend graduate school, student report	0,1	25.4% (.44)	24.4% (.43)	30.7% (.46)
0=Student expects H.S. graduation or less	--	9.0%	8.8%	7.6%
Youth performs below ability, teacher report	0,1	7.9% (.27)	6.9% (.25)	10.1% (.30)
Grades, student report	0.5 - 4	3.0 (.72)	3.1 (.72)	2.8 (.68)
Standardized test scores	25 - 76	51.3 (9.77)	53.2 (9.52)	45.6 (8.17)
Parent received a note from school about youth's academic performance, parent report	0,1	48.2% (.50)	49.3% (.50)	43.7% (.50)
Youth is behind grade (i.e., Age 15 or older in 8th grade)	0,1	29.5% (.46)	27.7% (.45)	35.2% (.48)
Youth has changed schools 4 or more times between 1st and 8th grades, student report	0,1	10.3% (.30)	10.2% (.30)	11.0% (.31)
School Characteristics				
Youth attended sexuality education classes once a week, student report	0,1	15.9% (.37)	15.2% (.36)	20.1% (.40)
More than 40% of students in school are black, student report	0,1	11.7% (.32)	3.7% (.19)	57.7% (.50)
More than 50% of students in school receive free lunch, student report	0,1	14.5% (.35)	6.4% (.24)	36.4% (.48)
50% or more of students in school live with a single-parent family, student report	0,1	10.7% (.31)	6.6% (.25)	31.1% (.46)
Index of school crime, student report	0 - 24	7.5 (6.55)	7.4 (6.37)	7.8 (6.83)
School is in top 20% of school safety index, teacher report	0,1	22.2% (.42)	24.8% (.43)	16.0% (.37)